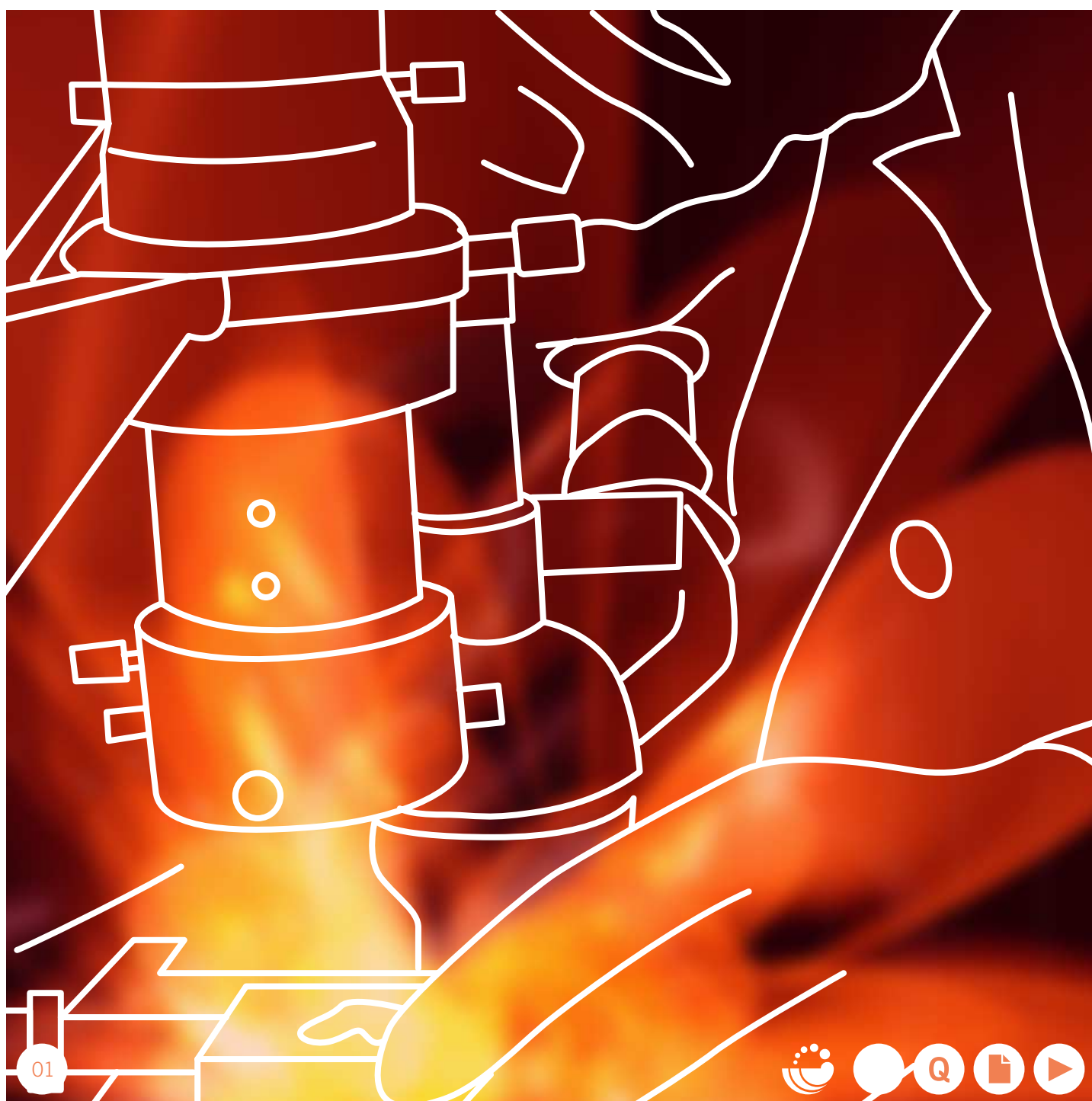


## WHAT IS REGULATORY TOXICOLOGY?



Regulatory toxicology is the study of the adverse effects of chemicals, not just on humans, but also on all living organisms including plants, animals, fungi and insects.

Chemicals are everywhere – in the foods we eat, the cars we drive, the clothes we wear. Some chemicals are used to help people, such as the chemicals in medicines. Most people know that not all chemicals are good for them. Most people also know that high doses of the same chemicals used to help them in medicines can damage health. But which chemicals are harmful? How much of a chemical does it take to damage health? What are those damaging effects? How do those effects occur? How do you ensure you use chemicals safely?

These are questions toxicologists set out to answer.

### **Toxicologists try to find out how toxic chemicals are**

If a chemical is very toxic, only a small amount causes harmful effects. If the chemical is less toxic, larger amounts may be needed before any harmful effects are seen.

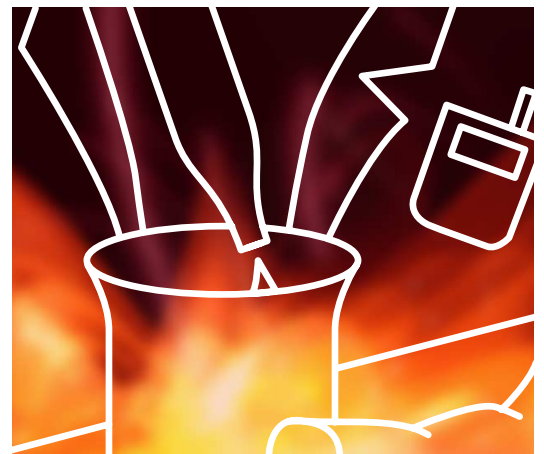
### **Toxicologists try to find out what the toxic effects of chemicals are**

Chemicals can have many types of harmful effects. For example, some cause allergic reactions, some irritate the eyes or skin, some harm genetic material, some can cause birth defects and others can cause cancer. Some effects are reversible, while others are not. Some chemicals don't harm human health but can damage the environment.

### **Toxicologists try to find out where toxic effects occur**

Some effects occur at the site (part of the body) that comes

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into contact with the chemical, while others may occur away from the site of exposure.

Some chemicals harm specific organs of the body, such as the liver or heart. These are called the 'target organs'. Toxicologists try to find out which organs a chemical can affect and how these organs are affected.

### **Toxicologists try to find out how a chemical causes its toxic effects**

The main ways you can be exposed to a chemical are by swallowing it (ingestion), by breathing it in (inhalation) or by coming into skin contact with it (dermal). Chemicals can be more toxic in one form of exposure than in another. For example, a chemical may be very harmful if you swallow it, but not as harmful if you splash it on your skin.

Sometimes, it's not the chemical itself that has harmful effects, but its metabolites (chemical substances produced by cells in the body as the body processes the chemical) that are harmful.

### **Toxicologists try to find out what length of exposure causes a toxic effect**

The effects of a chemical also depend on how long you are exposed to that chemical. Some chemicals cause harmful effects after long-term (chronic) exposure, whilst others can cause harmful effects after only short exposure (short-term, or acute exposure) e.g. acid burns. Some chemicals cause both short- and long- term effects.

### **Toxicologists make predictions**

Toxicologists often find out about the effects of chemicals by collecting data from laboratory experiments on animals. They use their skills to predict what is likely to occur if humans come into contact with the same chemical.

In laboratory studies, animals are often exposed to much higher levels of a chemical than would normally be experienced by humans from normal use of that chemical. Toxicologists have developed a number of ways of predicting the likely effects at lower exposure levels.

### **Prediction and Regulation for Safe Chemical Use**

Prediction is very important when making regulations to protect people and the environment from the harmful effects of chemicals. In real-life situations, it's not just the toxicity of a chemical, but the risks associated with how it is used that are important. Regulatory toxicologists assist in making regulations by finding out the risks of using a chemical, that is, how likely the chemical is to cause harm in a particular situation. With this information, they can make recommendations about how to minimise the risks.

Prediction forms a large part of what NICNAS staff do when they assess a chemical. By collecting information about how people use a chemical, what its effects are and how it causes those effects, NICNAS staff assess the risk of health or environmental effects of the chemical. They then make recommendations on how to minimise these risks so the chemical can be used safely.

If you want to find out more about how NICNAS staff assess chemicals, click on the following link:  
<http://www.nicnas.gov.au/about/ourapproach.htm>